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**Subject:** RE: listing response  
**Date:** Thursday, July 24, 2014 5:05:03 PM

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The document just sent was responses by Big Valley Band of Pomo Indians.

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## RESTORATION ACTIONS FOR CLEAR LAKE HITCH *Lavinia exilicauda*

### SUMMARY

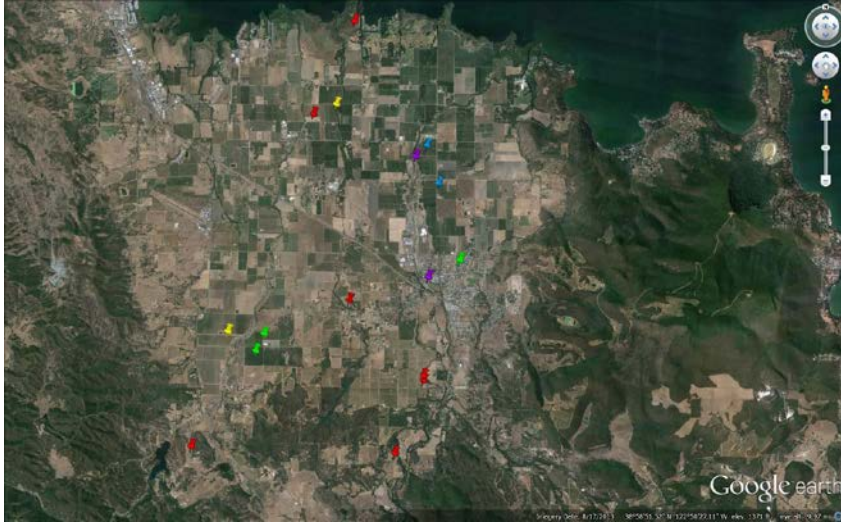
#### Introduction

Clear Lake hitch, *Lavinia exilicauda* is sacred to the local Pomo people of Clear Lake. Indeed Big Valley Rancheria Tribal members continue to collect, consume and share hitch among families. For instance, hitch is served during the annual Tule Boat Festival. In addition there are annual gatherings to smoke and dry the hitch. Renewed interest in traditional foods has led to a recent increase in requests by Native Americans to harvest hitch from the adjacent creeks. The fish also an important food for sensitive species such as bald eagles *Haliaeetus leucocephalus* and Osprey *Pandion halietus*. Hitch is categorized as an Anadromous/Ad fluvial fish species which spends a large part of their adult life in the lake water and ascend to freshwater streams/creeks to spawn. The Clear Lake tributaries are historical spawning grounds for numerous species of fish, including Clear Lake Hitch *Lavinia exilicauda*. In the recent past Big Valley Rancheria Tribal Elders are concerned about the decreasing numbers consumed which pale in comparison compared to the levels that occurred even 20 years ago. Past documented history on the hitch show that the fish was once "The most abundant fish and run up all the creeks (Colman 1930). According to Stone (1873), it was not unusual to see one or two acres of ground covered with hitch, which the Native American Indians dried for food. According to Bairrington, (1999) the hitch populations started to decline in the early 1960s. Specifically, percent composition of hitch relative to the total catch from small beach seine hauls collected from Clear Lake was 4.4 and 6.8 in 1961 and 1962, respectively. The percent composition of hitch relative to total catch declined to 0.1 in 1989.

Recent research shows a profound decline in hitch populations in Clear Lake from historical population levels to the current extant levels occasioned by loss of wetlands and spawning habitats through changes in land and water uses, loss of nursery areas, construction of dams and barriers that block migratory routes, water abstraction/quantity for agriculture (Clear lake basin is a site of intensive agriculture for vineyards and orchards) and quality (sedimentation, nutrient and pesticide loading into the lake, aging septic systems, mercury and arsenic (Suchanek *et al.* 2002), parasitic infections and predation by alien fishes as well as climatic change impacts. Human land use has profoundly altered hydrologic patterns and stream morphology of Clear Lake tributaries, causing stream flow to go subsurface in these streams earlier in the season than previously.

Water use in the hitch bearing creeks has been extensive in the past several decades, leading to a reduction in flow that has often left juvenile hitch stranded. In 2014, adults were stranded, including females that had not yet spawned. A review of water rights holders on Kelsey and Adobe Creeks shows an increasing use of water over the decades, peaking in the 1980's. Hundreds of millions of gallons are diverted for agricultural and domestic use, according to State Water Resources Control Board data. Kelsey Creek's water rights applications went from 1 in 1960's, 1 in 1970's, 25 in 1980's, 1 in 1990's and 3 in the 2000's. Adobe Creeks water rights applications went from 1 in the 1960's, 1 in the 1970's, 5 in the 1980's, 0 in the 1990's and 1 in the 2000s.

There are 31 water rights holders on Kelsey Creek and 7 water rights holders on Adobe Creek (with 10 water diversions).



Well permits granted between 2008 and 2014 along Adobe and Kelsey Creek.

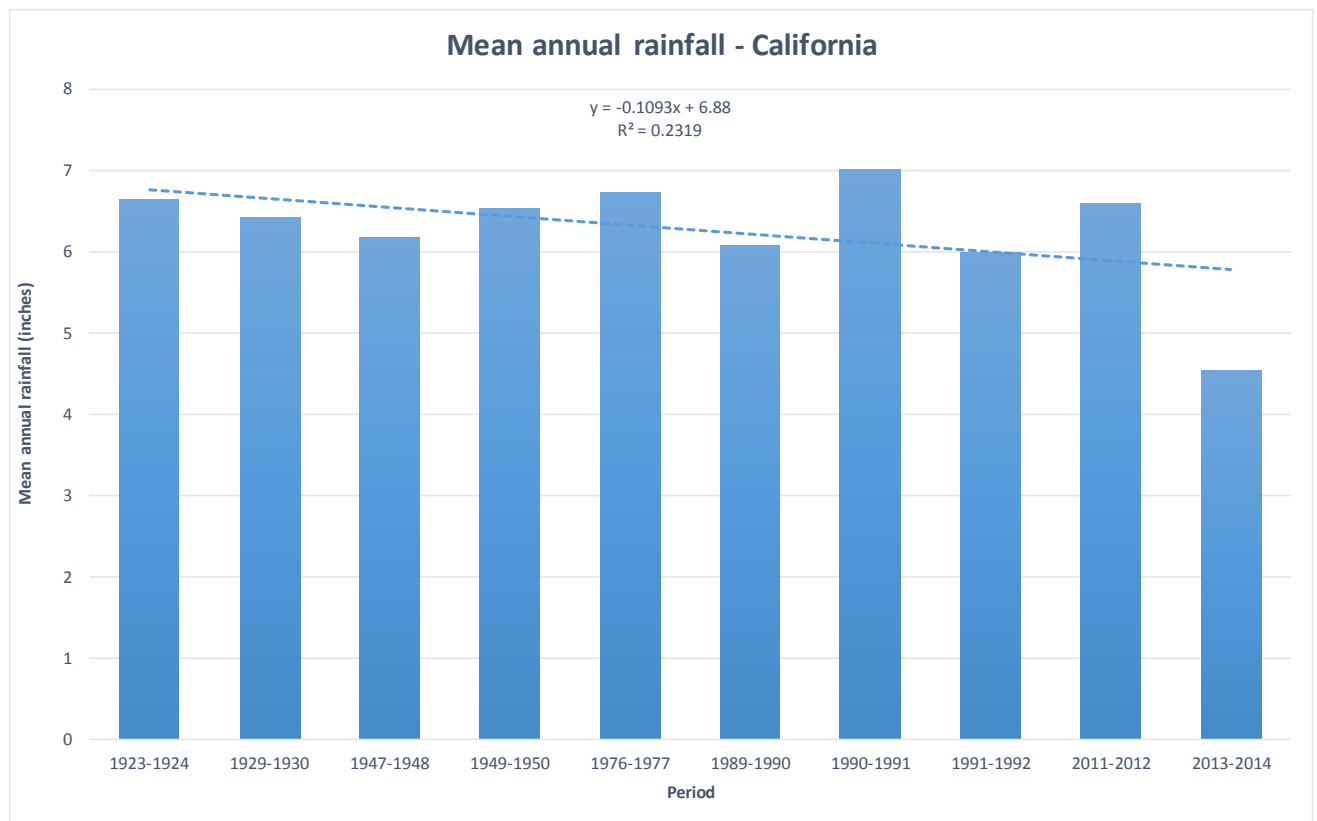


Figure 1. Long term datasets of California showing a decrease in the mean annual rainfall.

Dams and diversions, groundwater pumping, and sedimentation all contribute to the problem by either lowering the water table or filling the stream channel with aggregate and thereby causing flows to go subsurface. Conversely, in stream gravel mining e.g. at Kelsey Creek strips the channel of suitable aggregate for spawning and cause water tables to decrease. In addition gravel mining accelerates the flow of water reducing the leaching capacity to groundwater.

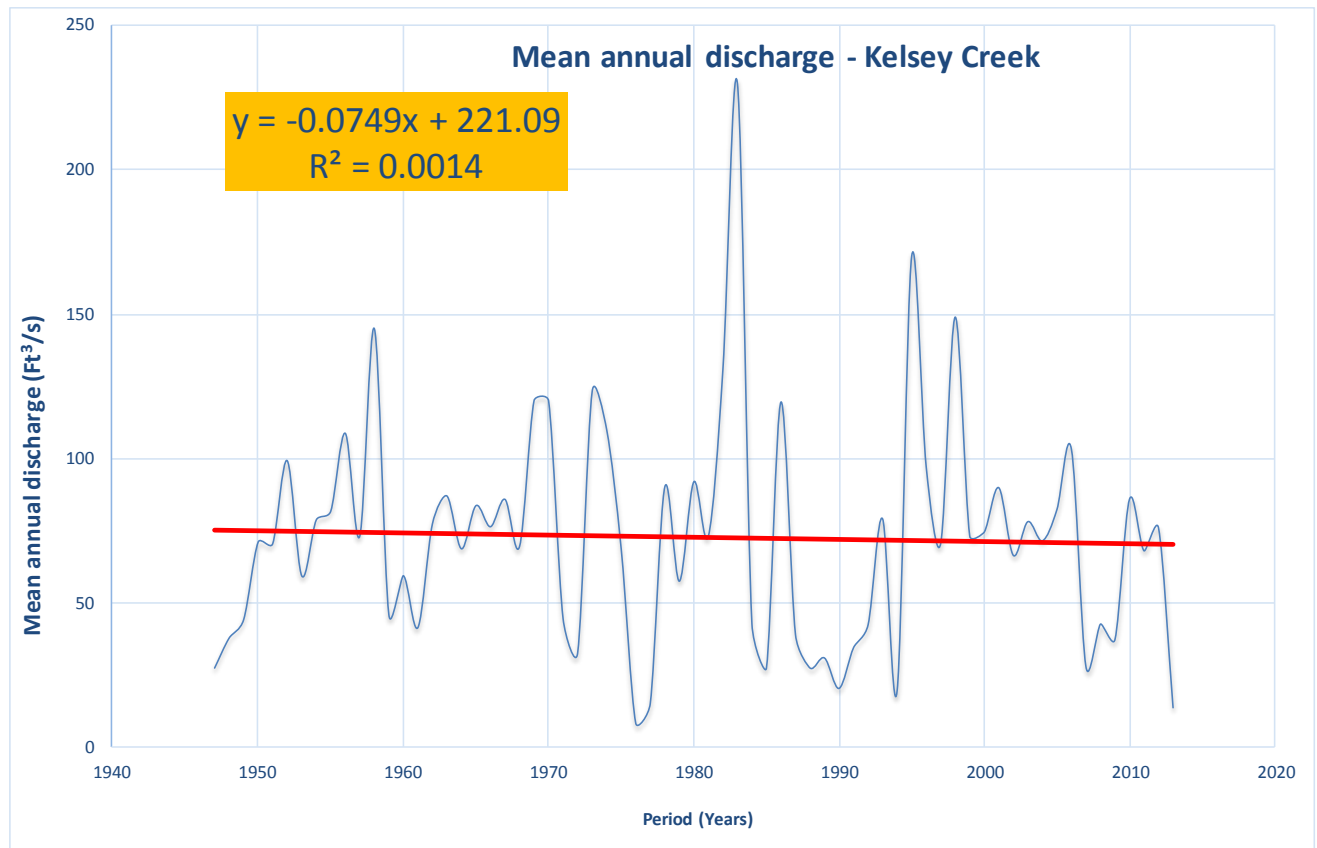


Figure 2. Long term datasets of mean annual flows of Kelsey Creek, Clear Lake showing a general trend of decreasing flow

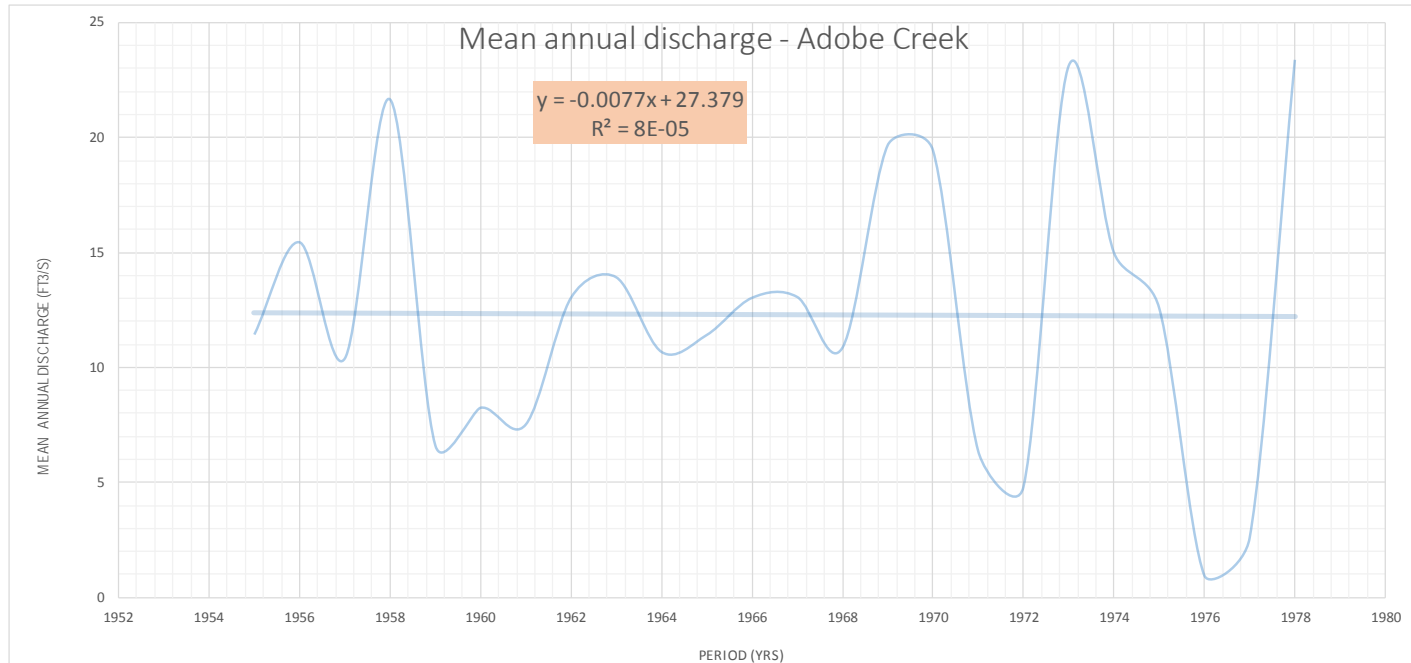


Figure 3. Long term datasets of mean annual flows of Adobe Creek, Clear Lake

This is compounded by grazing and urban development which has reduced the rate of rainwater infiltration. There is now compelling evidence that nearly all creeks tributary to Clear Lake have been altered by some combination of dams, pump and diversion irrigation systems, development, gravel mining, levee systems, road crossings, bridge aprons, conversion of adjacent land to agricultural uses, and off-road vehicle use. Research indicates that some habitat types conducive to the hitch life cycles and ecology have been declined precipitously in Clear Lake including the spawning tributaries, tule growths zones for feeding and rearing and littoral zones for adulthood. Numerous water diversions, have impacted the ability of anadromous fish to reach suitable spawning grounds.

## Restoration actions

Restoration efforts to prevent extirpation of Clear Lake Hitch include

### 1. Barriers and fish passage

Removal of barriers to increase spawning range to enable the fish access upper reaches/ zones with good water quality and suitable spawning.

## Other recommendations

### 2. Environmental flow assessment

Provision of Adequate timing and/or magnitude of flow and storage to provide suitable conditions for one or more life stages of Hitch. Setting fish flow standards that consistently require unimpaired flows taking into consideration important flows for spawning, egg incubation, and juvenile rearing and migration. This can be

achieved by formation of watershed based plans- bringing together all stakeholders and the interested public to develop a reasonable, implementable restoration plan that **balances** the needs of anadromous fish with those of all parties that have an interest in the wise management of Clear Lake Stream water resources

- a. Water storage and release at Hillspring and Adobe reservoirs should be explored to provide environmental flows in June to enable the Hitch to complete its life cycle at Adobe Creek

### **3. Restoration of Stream habitat at Kelsey and Adobe Creek**

**This will involve efforts to revert the stream bed to pristine conditions as follows;**

- a) Enhancement of spawning gravel
- b) Erosion and sedimentation control- from riparian and upland land use impacts.
- c) Restoration of bank and riparian cover.
- d) Returning a natural channel meander to eliminate braided conditions caused by sand mining (in Kelsey), where water temperature becomes too warm for fish survival and/or water dries up during summer months.
- e) Rebuilding critical habitat for the hitch life cycle will be supplemented with a captive breeding program for restocking. The hatchery at Robinson Rancheria is best suited for artificial propagation of hitch.

#### References cited

1. Bairrington, P.K. 1999. Clear Lake Fishery Management Plan. California Department of Fish and Game Region 1. Page 88. Unpublished
2. Suchanek, T.H., P.J. Richerson, D.C. Nelson, C.A. Eagles-Smith, D.W. Anderson, J.J. Cech, Jr., G. Schladow, R. Zierenberg, J.F. Mount, S.C. McHatton, D.G. Slotton, L.B. Webber, A.L. Bern, and B.J. Swisher. 2002. Evaluating and managing a multiply-stressed ecosystem at Clear Lake, California: A holistic ecosystem approach "Managing For Healthy Ecosystems: Case Studies," CRC/Lewis Press. pp. 1233-1265.
- 3.



**Figure.** California Department of Fish and Wildlife (CDFW) and Tribal EPA staff releasing young fish into Clear Lake rescued from Adobe- Merritt crossing





Figure . Electrofishing by CDFW to rescue young stranded Hitch at Adobe/ Merrit crossing





**Figure. Young hitch recovered from receding water pools at Adobe were rescued by a team consisting of and transported to the Lake**



**Figure. Rescuing young Hitch in diminishing water pools at Adobe Finley**





**Figure Dead Suckers and Hitch retrieved from a drying creek bed at Adobe/ Soda bay road.**





**Figure.** California Department of Fish and Wildlife transferring adult hitch and suckers from Adobe creek to Kelsey creek which has some water flow